

### AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions of claims in the application:

#### **Listing of Claims:**

1. (Currently Amended) A computer implemented system, comprising:  
services for representing a resource including at least one of a device, content, an application or a user, each service coupled to a decentralized operating system is an autonomous computation entity that exchanges one or more messages with a service coupled to a disparate decentralized operating system that resides in a different trust domain with a different security policy based in part on a protocol specified by the service, ~~the service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive;~~  
a port associated with each service that is endowed with one or more behavioral types that are specified by a unilateral contract, communication between services representing disparate resources is established based in part on compatibility between the one or more behavioral types associated with each service; and  
the decentralized operating system for orchestrating the services executing on the computer system so as to control and coordinate resources, such that the services representing the resource perform computations on a plurality of computers linked by communication network;~~;~~ and  
wherein a memory coupled to a processor that retains the decentralized operating system.
2. (Original) The computer system of Claim 1, wherein the computer system includes a microcomputer, a personal digital assistant, a cellular phone, or a display.
3. (Original) The computer system of Claim 1, wherein the designation primitive includes a port identifiable by an identifier that includes a uniform resource identifier.
4. (Original) The computer system of Claim 3, wherein the port is endowed with a

behavior type as specified by a unilateral contract.

5. (Original) The computer system of Claim 1, wherein a unilateral contract of the behavioral primitive defines a protocol for exchanging messages in a particular order with a service to whom the unilateral contract belongs.

6. (Original) The computer system of Claim 5, wherein the communication primitive includes a set of message types usable in the messages exchanged among services so as to call a service to perform a certain task.

7. (Original) The computer system of Claim 6, wherein the decentralized operating system separates the control information from the data information in the messages when the messages are exchanged.

8. (Original) The computer system of Claim 1, wherein services include services.

9. (Currently Amended) A computer implemented networked system for networking computer systems, comprising:

a first decentralized operating system executing on a computer system, which includes:

a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service;

a second decentralized operating system executing on a disparate computer system coupled to the network, which includes:

a second distributing kernel for designating uniform resource identifiers for a second set of services and distributing messages among the second set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service, communication between the first and second set of services is established based in part on compatibility determined between behavioral types specified by the unilateral contract associated with each service;

wherein a resource being represented as services from the second set of services is orchestrated by the first distributing operating system, the services representing the resource perform computations on a plurality of computers linked by communication network; and

wherein a memory coupled to a processor that retains at least one of the first or the second decentralized operating system.

10. (Original) The networked system of Claim 9, wherein services includes device drivers for devices.

11. (Original) The networked system of Claim 9, further comprising a process kernel for communicating messages as processes among services.

12. (Original) The networked system of Claim 10, further comprising an operating system kernel for managing memory, controlling devices, maintaining time and date, and allocating system resources.

13. (Original) The networked system of Claim 9, further comprising a network coupled to the first computer system, the network is selected from a group consisting of high bandwidth, low latency systems; high bandwidth, high latency systems; low bandwidth, high latency systems; and low bandwidth, low latency systems.

14. (Cancelled)

15. (Cancelled)

16. (Currently Amended) The networked system of Claim ~~[[14]]~~ 13, wherein a service from the second set of services registers with the first distributing kernel to obtain a uniform resource identifier.

17. (Currently Amended) The networked system of Claim ~~[[14]]~~ 13, wherein the first distributing kernel distributes a message to a service from a first set of service, the message

being sent by a service from a second set of services.

18. (Currently Amended) The networked system of Claim [[14]] 13, wherein the first decentralized operating system orchestrates a composition of a service from a first set of services and a service from a second set of services.

19. (Currently Amended) A computer implemented system, comprising:  
a decentralized operating system that includes a distributing kernel, comprising:  
a URI (Uniform Resource Identifier) manager for managing names, each name constituting a unique designation of a service at the computer system so that the service can be discovered, a resource is represented by multiple services, wherein the service is an autonomous computation entity that exchanges one or more messages with a disparate service that resides in a different trust domain with a different security policy based in part on a protocol specified by the service, the multiple services perform computations on a plurality of computers linked by communication network; and

a message dispatcher for forwarding messages among services, each service being identifiable by a name managed by the URI manager, ~~each service being associated with a unilateral contract~~ the each service includes a port that is endowed with one or more behavioral types that are specified by a unilateral contract, communication between the services is established based in part on compatibility between the one or more behavioral types associated with each service; and

wherein a memory coupled to a processor that stores at least one of the URI manager or the message dispatcher.

20. (Original) The computer system of Claim 19, wherein the distributing kernel further comprises a security manager for controlling authentication and authorization of rights and restrictions among services.

21. (Original) The computer system of Claim 19, wherein the distributing kernel further comprises a service loader for executing a sequence of instructions for loading components and services, the service loader being capable of dynamically loading or unloading services during the operation of the decentralized operating system.

22. (Original) The computer system of Claim 19, wherein the URI manager receives a register message from a service to obtain a unique designation and assigns the unique designation to the service, the URI manager being capable of receiving an unregister message for removing an assigned unique designation from a registry.

23. (Original) The computer system of Claim 19, wherein the message dispatcher forwards a message from a first service to a second service if the first service has a first uniform resource identifier assigned by the URI manager and the second service has a second uniform resource identifier assigned by the URI manager.

24. (Original) The computer system of Claim 19, wherein the message dispatcher includes a message validity verifier for verifying that a message sent to the message dispatcher is a message whose structure complies with the SOAP protocol.

25. (Original) The computer system of Claim 19, further comprising a network manager for distributing messages forwarded by the message dispatcher to another computer system.

26. (Original) The computer system of Claim 25, wherein the network manager comprises a serializer/deserializer, a transmission protocol processor, and a control/data plane separator.

27. (Currently Amended) A method implemented on a computer system, comprising:  
assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service; and

distributing a message to the first service using the unique name, the message being sent by a second service having a second unique name, the second service including a second unilateral contract for expressing the behaviors of the second service, the second service resides in a different trust domain with a different security policy compared to the first service, communication between the first service and the second service via the message is established when the first unilateral contract is compatible with the second unilateral contract, wherein the first and second ~~a resource is represented by multiple services~~ represent a respective resource.

28. (Original) The method of Claim 27, further comprising loading a network manager and other services according to instructions written in a customizable, tag-based language.

29. (Original) The method of Claim 28, further comprising spawning a service to listen for incoming messages for the first service that has been assigned the first unique name.

30. (Original) The method of Claim 29, further comprising rejecting the message without distributing the message if a structure of the message fails to comply with a protocol for exchanging structured and type information of messages written in a customizable, tag-based language.

31. (Original) The method of Claim 30, further comprising forwarding the message to the first service without routing the message through the network manager if the first service and the second service runs on a computer system.

32. (Original) The method of Claim 30, further comprising forwarding the message to the first service by routing the message through the network manager if the first service runs on a first computer system whereas the second service runs on a second computer system.

33. (Original) The method of Claim 32, wherein the act of forwarding including transmitting data information separately from transmitting control information.

34. (Original) The method of Claim 33, wherein the act of transmitting includes transmitting data information in accordance with transmitted control information.

35. (Currently Amended) A computer-readable medium having instructions thereon for implementing a method, the method comprising:

assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service; and

distributing a message to the first service using the unique name, the message being sent by a second service having a second unique name, the second service including a second unilateral contract for expressing the behaviors of the second service, the message establishes communication between the first service and second service when the first unilateral contract is compatible with the second unilateral contract, the second service resides in a different trust domain with a different security policy compared to the first service, a resource is represented by multiple services.

36. (Original) The computer-readable medium of Claim 35, further comprising loading a network manager and other services according to instructions written in a customizable, tag-based language.

37. (Original) The computer-readable medium of Claim 36, further comprising spawning a service to listen for incoming messages for the first service that has been assigned the first unique name.

38. (Original) The computer-readable medium of Claim 37, further comprising rejecting the message without distributing the message if a structure of the message fails to comply with a protocol for exchanging structured and type information of messages written in a customizable, tag-based language.

39. (Original) The computer-readable medium of Claim 38, further comprising forwarding the message to the first service without routing the message through the network manager if the first service and the second service runs on a computer system.

40. (Original) The computer-readable medium of Claim 38, further comprising forwarding the message to the first service by routing the message through the network manager if the first service runs on a first computer system whereas the second service runs on a second computer system.